TRANSLATION (KW-12PCT):

WO 2004/058573 A1 PCT/EP2003/14438

PACKAGING MACHINE PATH COMPRISING A DEVICE FOR IMPINGING A GASEOUS OR VOLATILE SUBSTANCE UPON PACKAGINGS

The invention relates to a packaging machine path for producing deep-drawn packaging cavities from a plastic film comprising a device for acting upon the packagings with a desired gas inside the closed packaging, for example, an inert gas or oxygen-enriched air.

A plurality of such packaging machines are known from the prior art. Such a machine path is described, for example, in DE 102 14 34477. This patent application is hereby introduced as reference and is thus considered as part of the disclosure.

In known packaging machine paths, the film deep drawn to form packaging cavities is cooled, then filled, optionally degassed or acted upon with inert gas and finally sealed. In this situation, the problem arises however that the production and filling of the packages on conventional packaging machines is plant- and time-intensive.

It is thus the object of the invention to provide a packaging machine path which does not have the disadvantages of the prior art.

The object of the invention is solved by a packaging machine path having the features of claim 1. Preferred embodiments at the invention can be found in the dependent claims.

According to the invention, a packaging machine path is provided, comprising at least one deep-drawing station and at least one filling station, wherein a device for acting upon the deep-drawn packaging cavities with a gaseous or volatile substance which has a boiling or sublimation point at atmospheric pressure of <10°C and a temperature of <3°C is arranged between said stations.

It is known to the person skilled in the art that the volatilisation of a substance describes the material– specific pressure- and temperature-dependent tendency to be transferred from the solid or liquid state into the gas phase.

The gaseous or volatile substance can be any substance which is gaseous or vaporises at atmospheric pressure and a temperature of <1°C and should at least partly form the atmosphere inside the sealed packaging. These can be inert gases such as nitrogen or carbon dioxide, or oxygen or oxygen—enriched air. The substances can also be added in their liquid, solid and/or gaseous state of aggregation and then vaporize, volatilise and/or sublime inside the packaging. Sublimation is understood as the transition from the solid to the gas phase. Thus, for example, dry ice or liquid nitrogen can be fed into the packaging cavities and becomes gaseous therein.

The person skilled in the art understands that the choice of gaseous or liquid substances depends on the requirements of the filled material stored inside the packaging and is not subjected to any restrictions on the part of the installation technology used. The gaseous or liquid substance is preferably selected so that the gaseous or liquid substance is present exclusively in the gaseous or liquid phase inside the packaging under the usual conditions during tilling of the package with filled material. Quite especially preferably CO_2 and/or N_2 having a temperature of < -50°C, preferably < -100°C, quite especially preferably

< -150°C, is used.

In the packaging machine paths according to the invention, the deep-drawn packaging cavities are acted upon with the gaseous or volatile substance such that at least a first cooling of the film heated by the forming process and/or a previous heating process occurs and that the packaging cavities undergo a first gas exchange, that is a displacement of the air present in the packaging cavities.

It is extremely astonishing for the person skilled in the art that when using the packaging machine path according to the invention, deep-drawn packaging cavities can at least be deep-cooled in a single device and can optionally be partially inertised. In most cases, the packaging cavities can hereby be cooled very rapidly below a maximum temperature required for the further processing, for example, the filling, for example 2°C. Strong cooling of the surfaces alone is frequently sufficient to keep the packaging at least below the permissible maximum temperature during the entire packaging process because the heat stored in the film, which is transported in the direction of the cooled surface with time, is not sufficient to raise the surface

above the permissible maximum temperature. The packaging cavities are at least partially sterilised.

After the gaseous or volatile substance has acted upon the packaging, said substance remains at least partly inside the packaging cavity so that any gas exchange which may take place after the packaging cavity has been filled with packaging material can be completely eliminated or at least significantly shortened because at least the gas underneath the packaging material need not be exchanged or need only be exchanged to a lesser degree.

Means and devices for acting upon a packaging cavity with a gaseous or volatile material are known to the person skilled in the art. In an advantageous embodiment of the invention these means consists of supply pipes which open into outlet openings over each individual packaging cavity.

In one advantageous embodiment of the invention these means are located above the packaging cavities so that the gaseous or volatile substance can be fed directly into the packaging cavities.

In an especially preferred embodiment of the invention, the outlet openings have slotted nozzles from which the gaseous or volatile substances enters into the packaging cavities. This ensures a more intensive and more uniform action on the packaging cavities over their entire length and/or width using simple means.

In a further advantageous embodiment of the invention1 the means are embodied such that at least two packaging cavities can be acted upon with the gaseous or volatile substance at the same time. The throughput of a packaging machine path according to the invention is thus increased in an especially simple manner. In an especially preferred embodiment of the invention, the throughput is accomplished in a synchronised fashion so that a plurality of, especially six packaging cavities can be heated, deep-drawn and acted upon with the gaseous or volatile substance. The throughput of the packaging machine path according to the invention is thus increased in an especially simple manner.

The quantity of volatile substance introduced is determined in a fashion known to the person skilled in the art according to the desired result with regard to the cooling of the heated material and the desired quantity of material inside the packaging cavity.

In a further advantageous embodiment of the invention the packaging cavities acted upon with the gaseous or volatile substance are then directly covered whereby an almost unchanged gas atmosphere can persist in a simple fashion inside the packaging cavity. In an especially preferred embodiment of the invention, this covering can be provided by a cover plate, which preferably takes place between the cooling and the filling and/or between the filling and the sealing of the packaging cavities.

In a further preferred embodiment of the invention, the packaging machine path further has means provided for collecting and returning escaped, for example vaporised or volatilised, substance to the processing process after the action. In an especially preferred embodiment of the invention, the gases thus

collected can additionally be used for gas exchange in the packaging cavity before its sealing.

The invention is explained in detail subsequently with reference to Figures 1 and 2. However, these figures merely show exemplary diagrams of a device according to the invention and in no way restrict the inventive idea.

Figure 1 shows a cutaway side view of a part of a packaging machine path according to the invention,

Figure 2 shows a plan view of the packaging machine path according to Fig. 1.

Figure 1 shows a cutaway side view of a part of a packaging machine path 2 according to the invention. The packaging machine path 2 comprises a heating system 8, a deep-drawing station 6 and a device 1 for acting upon the packaging cavities 4 with a gaseous or volatile substance.

Figure 2 shows a plan view of the packaging machine path 2. The film 3 whose edges are shown by dashed lines 9 runs in the

direction of the arrow 10 through the packaging machine oath 2. After passing through the deep-drawing Station 6 where the film 3 is formed into packaging cavities 4, the packaging cavities 4 are acted upon with a gaseous or volatile substance inside the device 1. For this purpose the device 1 has means 7 by which means the gaseous or volatile substance is fed from a supply (not shown) to the individual packaging cavities. The means 7 end centrally over each individual packaging cavity 4 and open into slotted nozzles 11 shown schematically whose longitudinal alignment is arranged perpendicular to the longitudinal alignment of the rectangular packaging cavities 4. The person skilled in the art understands that a particularly favourable embodiment of the slotted nozzles 11 is provided if the slotted nozzles 11 are arranged parallel to the longitudinal alignment of the packaging cavities and have a length which substantially corresponds to the length of the packaging cavities 4.

REFERENCE LIST

1	Device
2	packaging machine path
3	Film
4	Packaging cavity
S	Running direction of film
6	Deep-drawing station
7	Means
8	Heating system
9	Edge of film
10	Running direction of film
11	Slotted nozzle